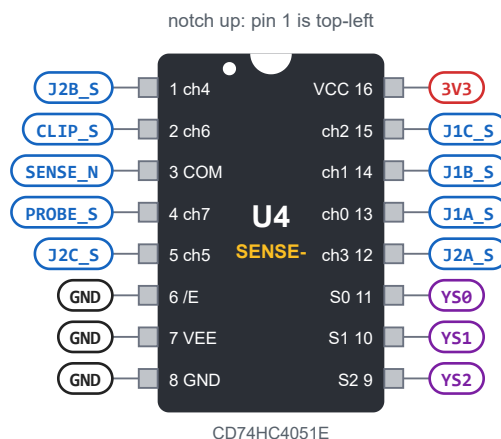
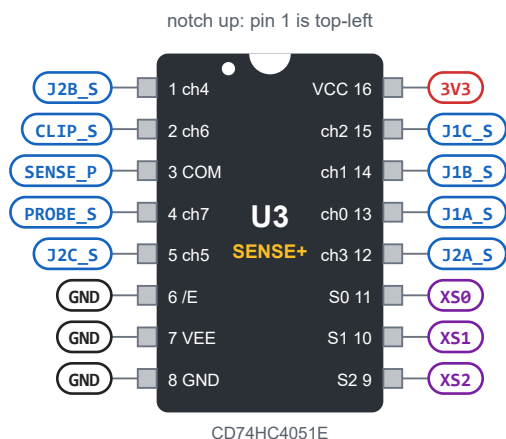
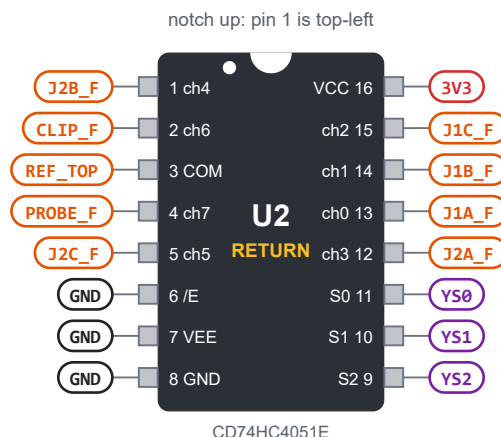
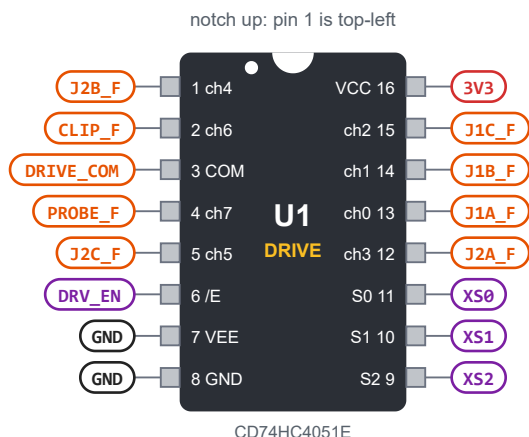


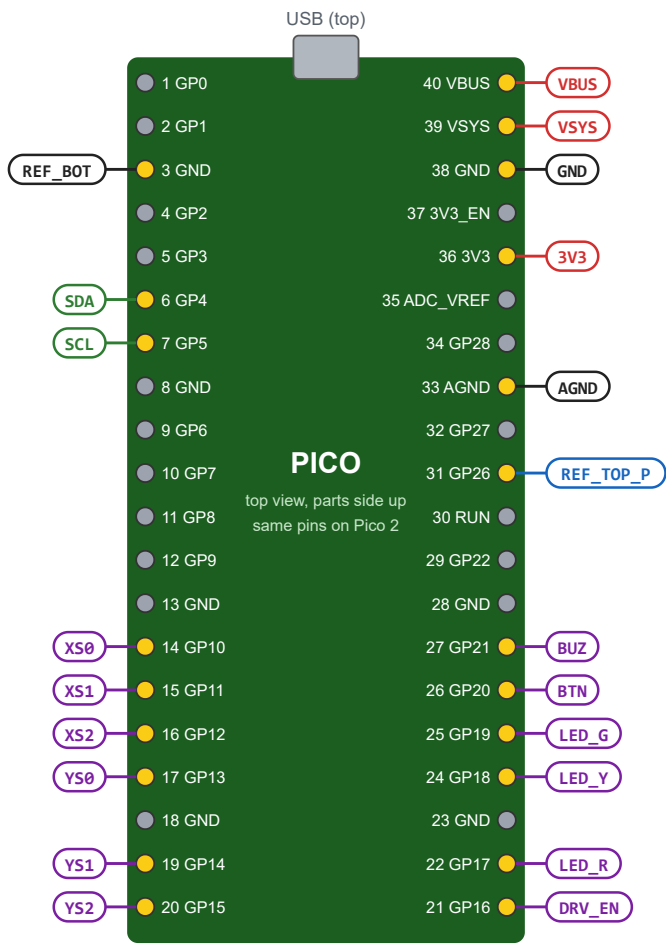
Every pin is labelled with its **net**. Pins with the same net label get joined. The numbered checklist from sheet 4 on lists every wire in solder order; tick each one. Wire colours: — power — ground — control — force (current) — sense (no current) — I2C data.

The four switch chips (top view)



Tip: put U1 next to U2 and U3 next to U4. Each terminal's FORCE wire lands on U1, then a short hop joins the same pin of U2. Each SENSE wire lands on U3, then a hop to U4. Same pin numbers, so the hops are short. Use DIP sockets if you have them.

Pico (top view)



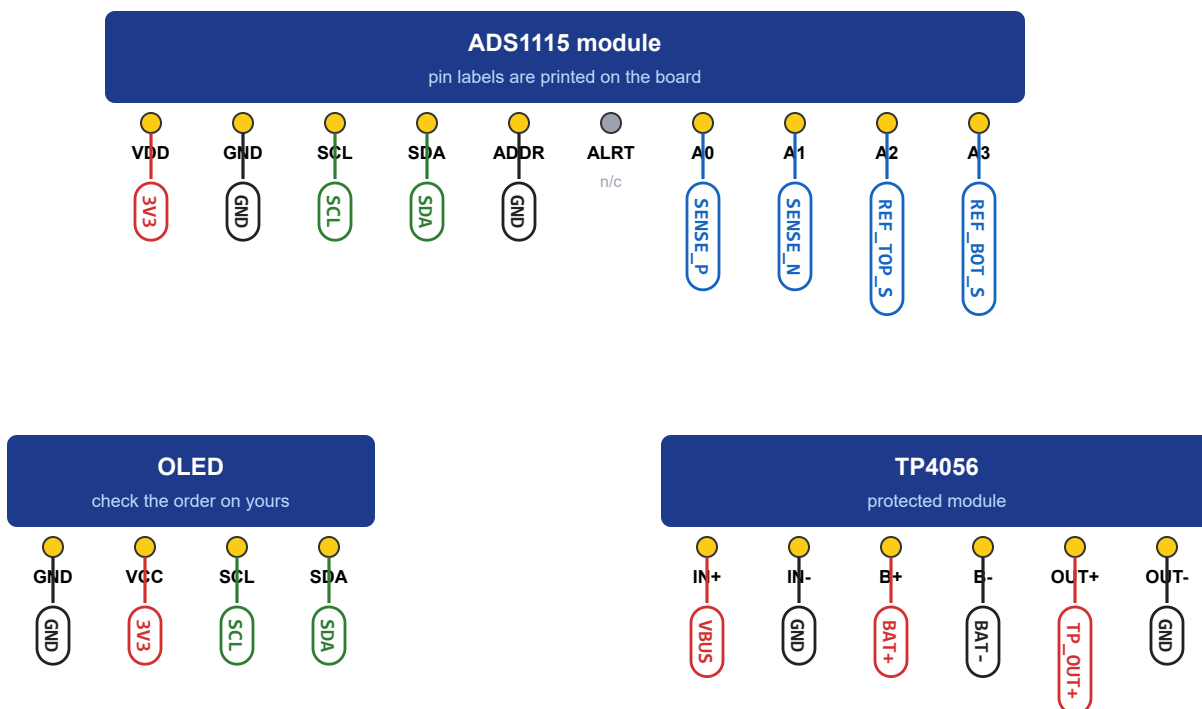
Yellow pins are used, grey are not.

Solder wires straight to the pads; no header pins needed.

GND appears on several pins: use pin 38 for the main ground, pin 3 for the R_REF ground star, pin 33 (AGND) to the same star.

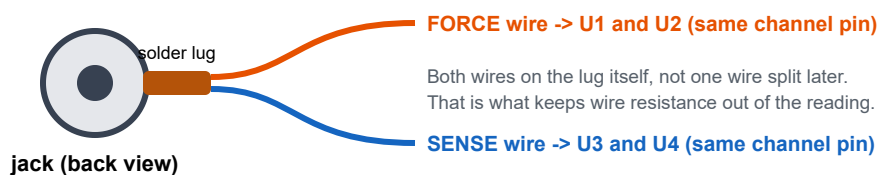
The Pico 2 has exactly the same pinout. Flash the matching file (Doc 34).

Modules

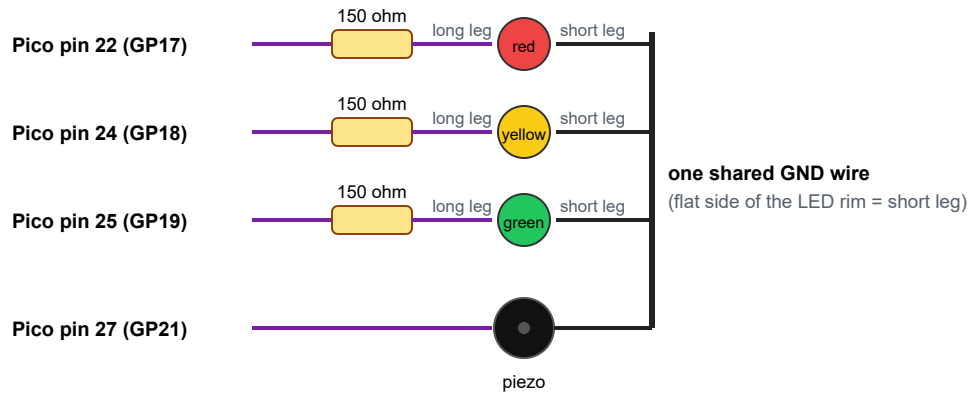


OLED modules come with VCC and GND in either order. Read the labels on yours; do not go by position.

Two wires per jack



Lights and piezo (on the lid)



They sit in the lid, so give these wires (and the screen's and J2's) about 10 cm of slack. The case notes say how far to trim the LED legs.

Wiring checklist

Step 1: Power: cell, charger, switch, diode

#	Net	From	To	Note
☐ 1	 BAT+	cell +	TP4056 B+	Cell holder red lead
☐ 2	 BAT-	cell -	TP4056 B-	Cell holder black lead
☐ 3	 TP_OUT+	TP4056 OUT+	switch middle lug	Slide switch middle lug
☐ 4	 SW_ON	switch outer lug	diode A (plain end)	Either outer lug of the switch
☐ 5	 VSYS	diode K (stripe)	Pico pin 39 (VSYS)	Diode stripe (K) towards the Pico
☐ 6	 VBUS	Pico pin 40 (VBUS)	TP4056 IN+	One USB port charges the cell

Step 2: 3V3 and ground to the chips and modules

#	Net	From	To	Note
☐ 7	 3V3	Pico pin 36 (3V3)	U1 pin 16 (VCC)	
☐ 8	 3V3	U1 pin 16 (VCC)	U2 pin 16 (VCC)	
☐ 9	 3V3	U2 pin 16 (VCC)	U3 pin 16 (VCC)	
☐ 10	 3V3	U3 pin 16 (VCC)	U4 pin 16 (VCC)	
☐ 11	 3V3	U4 pin 16 (VCC)	R_LIM 330 leg 1 (3V3 side)	
☐ 12	 3V3	R_LIM 330 leg 1 (3V3 side)	10 k leg 1 (3V3 side)	
☐ 13	 3V3	10 k leg 1 (3V3 side)	ADS1115 VDD	
☐ 14	 3V3	ADS1115 VDD	OLED VCC	
☐ 15	 GND	Pico pin 38 (GND)	U1 pin 8 (GND)	U2/U3/U4 pin 6 (/E) to ground keeps them always on; ADS ADDR to ground sets address 0x48
☐ 16	 GND	U1 pin 8 (GND)	U1 pin 7 (VEE)	
☐ 17	 GND	U1 pin 7 (VEE)	U2 pin 8 (GND)	
☐ 18	 GND	U2 pin 8 (GND)	U2 pin 7 (VEE)	
☐ 19	 GND	U2 pin 7 (VEE)	U2 pin 6 (/E)	
☐ 20	 GND	U2 pin 6 (/E)	U3 pin 8 (GND)	
☐ 21	 GND	U3 pin 8 (GND)	U3 pin 7 (VEE)	
☐ 22	 GND	U3 pin 7 (VEE)	U3 pin 6 (/E)	
☐ 23	 GND	U3 pin 6 (/E)	U4 pin 8 (GND)	
☐ 24	 GND	U4 pin 8 (GND)	U4 pin 7 (VEE)	
☐ 25	 GND	U4 pin 7 (VEE)	U4 pin 6 (/E)	
☐ 26	 GND	U4 pin 6 (/E)	ADS1115 GND	
☐ 27	 GND	ADS1115 GND	ADS1115 ADDR	
☐ 28	 GND	ADS1115 ADDR	OLED GND	
☐ 29	 GND	OLED GND	button leg 2 (ground)	
☐ 30	 GND	button leg 2 (ground)	red LED short leg	
☐ 31	 GND	red LED short leg	yellow LED short leg	

☐	32	 GND	yellow LED short leg	green LED short leg
☐	33	 GND	green LED short leg	piezo lead 2
☐	34	 GND	piezo lead 2	TP4056 OUT-
☐	35	 GND	TP4056 OUT-	TP4056 IN-

Step 3: Address buses and drive enable

#	Net	From	To	Note
☐	36	 XS0	Pico pin 14 (GP10)	U1 pin 11 (S0)
☐	37	 XS0	U1 pin 11 (S0)	U3 pin 11 (S0)
☐	38	 XS1	Pico pin 15 (GP11)	U1 pin 10 (S1)
☐	39	 XS1	U1 pin 10 (S1)	U3 pin 10 (S1)
☐	40	 XS2	Pico pin 16 (GP12)	U1 pin 9 (S2)
☐	41	 XS2	U1 pin 9 (S2)	U3 pin 9 (S2)
☐	42	 YS0	Pico pin 17 (GP13)	U2 pin 11 (S0)
☐	43	 YS0	U2 pin 11 (S0)	U4 pin 11 (S0)
☐	44	 YS1	Pico pin 19 (GP14)	U2 pin 10 (S1)
☐	45	 YS1	U2 pin 10 (S1)	U4 pin 10 (S1)
☐	46	 YS2	Pico pin 20 (GP15)	U2 pin 9 (S2)
☐	47	 YS2	U2 pin 9 (S2)	U4 pin 9 (S2)
☐	48	 DRV_EN	Pico pin 21 (GP16)	U1 pin 6 (/E)
				Pull-up keeps the test current off while the Pico boots
☐	49	 DRV_EN	U1 pin 6 (/E)	10 k leg 2

Wiring checklist (continued)

Step 4: Measuring core: R_LIM, R_REF, ADC inputs

#	Net	From	To	Note
☐ 50	 DRIVE_COM	R_LIM 330 leg 2	U1 pin 3 (COM)	
☐ 51	 REF_TOP	U2 pin 3 (COM)	R_REF 10 top leg	Current wire into the top of R_REF
☐ 52	 REF_TOP_S	R_REF 10 top leg	ADS1115 A2	Own wire, soldered at the R_REF leg (Kelvin)
☐ 53	 REF_TOP_P	R_REF 10 top leg	Pico pin 31 (GP26)	Pico GP26 watches for breaks in FLEX mode
☐ 54	 REF_BOT	R_REF 10 bottom leg	Pico pin 3 (GND)	R_REF bottom to a Pico GND pin: the ground star
☐ 55	 REF_BOT_S	R_REF 10 bottom leg	ADS1115 A3	Own wire, soldered at the R_REF leg (Kelvin)
☐ 56	 AGND	R_REF 10 bottom leg	Pico pin 33 (AGND)	Pico analog ground to the star
☐ 57	 SENSE_P	U3 pin 3 (COM)	ADS1115 A0	
☐ 58	 SENSE_N	U4 pin 3 (COM)	ADS1115 A1	

Step 5: Display, ADC data lines, button, lights, piezo

#	Net	From	To	Note
☐ 59	 SDA	Pico pin 6 (GP4)	ADS1115 SDA	
☐ 60	 SDA	ADS1115 SDA	OLED SDA	
☐ 61	 SCL	Pico pin 7 (GP5)	ADS1115 SCL	
☐ 62	 SCL	ADS1115 SCL	OLED SCL	
☐ 63	 BTN	Pico pin 26 (GP20)	button leg 1	
☐ 64	 LED_R	Pico pin 22 (GP17)	150 (red) leg 1	GP17 to the red LED's resistor
☐ 65	 LED_R_A	150 (red) leg 2	red LED long leg	Resistor to the long leg (anode)
☐ 66	 LED_Y	Pico pin 24 (GP18)	150 (yellow) leg 1	GP18 to the yellow LED's resistor
☐ 67	 LED_Y_A	150 (yellow) leg 2	yellow LED long leg	Resistor to the long leg (anode)
☐ 68	 LED_G	Pico pin 25 (GP19)	150 (green) leg 1	GP19 to the green LED's resistor
☐ 69	 LED_G_A	150 (green) leg 2	green LED long leg	Resistor to the long leg (anode)
☐ 70	 BUZ	Pico pin 27 (GP21)	piezo lead 1	GP21 to the piezo (either lead if unmarked)

The four 100 nF capacitors are not wires: solder each one straight across pins 16 and 8 of its chip, on the underside of the board.

Wiring checklist (jacks)

Step 6: Jacks: two wires each (force + sense)

#	Net	From	To	Note
☐ 71	 J1A_F	J1-A jack lug	U1 pin 13 (ch0)	J1-A force (ch0)
☐ 72	 J1A_F	U1 pin 13 (ch0)	U2 pin 13 (ch0)	
☐ 73	 J1A_S	J1-A jack lug	U3 pin 13 (ch0)	J1-A sense (ch0)
☐ 74	 J1A_S	U3 pin 13 (ch0)	U4 pin 13 (ch0)	
☐ 75	 J1B_F	J1-B jack lug	U1 pin 14 (ch1)	J1-B force (ch1)
☐ 76	 J1B_F	U1 pin 14 (ch1)	U2 pin 14 (ch1)	
☐ 77	 J1B_S	J1-B jack lug	U3 pin 14 (ch1)	J1-B sense (ch1)
☐ 78	 J1B_S	U3 pin 14 (ch1)	U4 pin 14 (ch1)	
☐ 79	 J1C_F	J1-C jack lug	U1 pin 15 (ch2)	J1-C force (ch2)
☐ 80	 J1C_F	U1 pin 15 (ch2)	U2 pin 15 (ch2)	
☐ 81	 J1C_S	J1-C jack lug	U3 pin 15 (ch2)	J1-C sense (ch2)
☐ 82	 J1C_S	U3 pin 15 (ch2)	U4 pin 15 (ch2)	
☐ 83	 J2A_F	J2-A jack lug	U1 pin 12 (ch3)	J2-A force (ch3)
☐ 84	 J2A_F	U1 pin 12 (ch3)	U2 pin 12 (ch3)	
☐ 85	 J2A_S	J2-A jack lug	U3 pin 12 (ch3)	J2-A sense (ch3)
☐ 86	 J2A_S	U3 pin 12 (ch3)	U4 pin 12 (ch3)	
☐ 87	 J2B_F	J2-B jack lug	U1 pin 1 (ch4)	J2-B force (ch4)
☐ 88	 J2B_F	U1 pin 1 (ch4)	U2 pin 1 (ch4)	
☐ 89	 J2B_S	J2-B jack lug	U3 pin 1 (ch4)	J2-B sense (ch4)
☐ 90	 J2B_S	U3 pin 1 (ch4)	U4 pin 1 (ch4)	
☐ 91	 J2C_F	J2-C jack lug	U1 pin 5 (ch5)	J2-C force (ch5)
☐ 92	 J2C_F	U1 pin 5 (ch5)	U2 pin 5 (ch5)	
☐ 93	 J2C_S	J2-C jack lug	U3 pin 5 (ch5)	J2-C sense (ch5)
☐ 94	 J2C_S	U3 pin 5 (ch5)	U4 pin 5 (ch5)	
☐ 95	 CLIP_F	CLIP jack lug	U1 pin 2 (ch6)	CLIP force (ch6)
☐ 96	 CLIP_F	U1 pin 2 (ch6)	U2 pin 2 (ch6)	
☐ 97	 CLIP_S	CLIP jack lug	U3 pin 2 (ch6)	CLIP sense (ch6)
☐ 98	 CLIP_S	U3 pin 2 (ch6)	U4 pin 2 (ch6)	
☐ 99	 PROBE_F	PROBE jack lug	U1 pin 4 (ch7)	PROBE force (ch7)
☐ 100	 PROBE_F	U1 pin 4 (ch7)	U2 pin 4 (ch7)	
☐ 101	 PROBE_S	PROBE jack lug	U3 pin 4 (ch7)	PROBE sense (ch7)
☐ 102	 PROBE_S	U3 pin 4 (ch7)	U4 pin 4 (ch7)	

Before closing the case, meter every jack lug to its four chip pins with the cell out.